P-6.3562

OBSERVATIONS ON THE 1962 EAST TEXAS SOUTHERN PINE BEETLE EPIDEMIC

By: Leroy Williamson, Head, Forest Pest Control Section
Texas Forest Service

INTRODUCTION

An annual summary of Southern pine beetle control project activities has been prepared since the project began in 1958. This report supplements similar reports prepared during the present Southern pine beetle epidemic.

In 1962 the beetles began their destructive life cycles with seemingly renewed vigor. Loblolly, shortleaf, slash and longleaf pines were attacked by this insect. Longleaf was previously considered a barrier to the spread of the beetle, but this proved to be unfounded in 1962. In January observers located 145 infested spots; the majority were infestations that remained uncontrolled during 1961. Although beetle activity was slowed during the winter months due to low temperature, broods remained healthy in appearance. An unusually mild February speeded brood development but the coldest weather in 40 years, 8 degrees on January 9, failed to have much noticeable effect on population survival. By mid-June an estimated 2,200 multiple-tree infestations occurred over an area involving 17 counties. The size of the epidemic area increased from 600,000 acres in 1961 to 4,500,000 acres. The total area of complete kill is estimated as 25,000 acres. The beetle population started to decline sharply in July and by the end of the year only five known infestations remained uncontrolled. These were reserved for research study areas.

In the period January 1 to December 31, 1962, a total of $491,420.72 was reported to the Texas Forest Service as spent in combating this insect. Some owners who did control work did not report expenditures to the Texas Forest Service. Also the total reported does not include expenditures made for control on the Angelina, Sam Houston and Davey Crockett National Forests. A statement of private landowner expenditures is given in the Appendix.

CALENDAR OF EVENTS

February 15 - Circular prepared by Texas Forest Service entitled "How To Minimize Damage While Pruning Along Utility Lines" was distributed to utility companies throughout East Texas.

February 21-23 - Mr. W. V. Benedict, who is in charge of pest control in the Washington office of the U. S. Forest Service, visited East Texas to observe our Southern pine beetle epidemic. On a tour of a portion of the flatwoods area he became familiar with some of the local problems involved in controlling the Southern pine beetles. He suggested that past efforts and future plans be re-examined and recommended that a biological evaluation be prepared incorporating a specific plan of action.

March 9 - A biological evaluation of the Southern pine beetle epidemic was prepared jointly by entomologists of the Texas Forest Service; Region 8 Pest Control Branch, U. S. Forest Service; and the Southern Forest Experiment Station. The report related the history of the epidemic, the biological factors involved, and recommended control procedure by priority zones for 1962.

March 15 - The Texas Forest Pest Committee met in Kountze, Texas at which time the Texas Forest Service submitted a control program of priority zones (Zone Map in Appendix). The minutes of this meeting contained these statements: "The Committee unanimously approved the control plan, within the limitations imposed by the respective authority of each of those in attendance. It was agreed that control work should begin in Zones I and II not later than March 26." One of the main points stressed by Dr. Folweiler and others was that the plan required 100% cooperation of all landowners. Without this cooperation, there will be no control program. It was announced at this meeting that the section of the Nursery Law that made control mandatory had been repealed and there was no authority to make any owner control infestation or for the Texas Forest Service to do the control without the landowner's permission.

April 11-12 - Specialists in several fields from the Southern Forest Experiment Station visited the East Texas epidemic area upon request by the Texas Forest Pest Committee for a review of the circumstances of the epidemic and to give consideration to a more comprehensive research program than entomological alone to cope with the Southern pine beetle.

April 24 - The control program adopted by the Texas Forest Pest Committee on March 15, was abandoned because of failure to obtain complete landowner cooperation.

May 18 - Proposal made by Southern Forest Experiment Station for expanded research.

June 7 - The Texas Forest Pest Committee met in Kountze, Texas, and agreed to reactivate the zone control program that had been terminated April 24. Acceptance of the plan was reaffirmed by landowners.

July 6 - The Texas Forest Pest Committee appointed four sub-committees to handle matters which require immediate attention. The sub-committees and chairmen are:

1. Coordinating Sub-Committee on Research - A. D. Folweiler, Chairman
2. Coordinating Sub-Committee on Field Control - Wallace Smith, Chairman
3. Legislative Sub-Committee - Ottis Locke, Chairman
4. Sub-Committee For Coordinating Federal, State, and Private Efforts, Ollie Crawford, Chairman

July 11 - An appeal was made to Governor Daniel for additional control funds.

July 23-27 - Dr. J. P. Vite and Bob Gara of the Boyce Thompson Institute for Plant Research found a positive response by Southern pine beetle to volatile attractants. Studies were conducted in the Southern pine beetle epidemic area near Warren.

August 2 - In Washington, D. C., Lud King, Ollie Crawford and A. D. Folweiler reviewed the beetle problem with USDA Secretary Freeman and USFS representatives. An allotment of $400,000 for 1/3 cost of control was made and

agreement for USFS to intensify Southern pine beetle research.

August 2 - County agricultural agents trained in identification and control to assist urban owners.

September 1 - A revised control plan was put into effect. Due to the sudden decline in the beetle population, the control plan objective was to have all known infestations in all zones controlled by December 15. The Texas Forest Service agreed to do work gratis for small landowners (ownership less than 400 acres) who were unable or unwilling to conduct control operations. Active spots for which the owner would not give permission to control remained untreated.

September 29 - The Texas Forest Pest Committee requested the Southern Forest Disease and Research Council to undertake research on the Southern pine beetle. Request was denied.

November 26 - Arrangements were made to set up a Texas organization to sponsor research on Southern pine beetle by the Boyce Thompson Institute For Plant Research, Inc. Large forest landowners in Texas will contribute to the fund.

December 10 - The Legislative Sub-Committee submitted a proposed forest pest act to the Texas Forest Pest Committee.

DETECTION

Detection procedure was the same as in previous years. A high-winged aircraft, Cessna 172 and 182, was used for aerial detection surveys. The Texas Forest Service grid block maps covered with drafting film were used in recording spot locations.

The system of reporting infestations to respective landowners was changed to alleviate the load of paper work. Flash reports and job order forms previously used were replaced by a single form which showed location of infestations by county, grid and ownership. This same form was used in summarizing detection flights and was mailed to landowners after each flight. A letter to forest landowners having Southern pine beetle infestations was also prepared following flights to report observations and current status of the project.

Aerial Observations

From 1958 through 1961, tabulations from Texas Forest Service records have shown the number of spots observed by flight date over the entire epidemic area. During 1962, flights from April 2, through June 5, were made only in Zones I and II. After June 5, Zone I was divided into two parts, IA and IB, because of the increase in spread of the infestations. Zone VIII, Harris and Galveston Counties, were separated from Zone II on July 10. Periodic flights outside the priority zones were made to observe the status of the epidemic but spots were not located for control purposes at that time. After August 20, aerial detection flights were made over the entire epidemic area. Several large landowner cooperators made detection flights on their respective ownerships during the year.

Spots Discovered from Aerial Observations, 1962

Date of Flight	Spots Observed	Date of Flight	Spots Observed
January 16	41 1/	June 5	222 2/ (1500) 3/
February 20	114 1/	June 19	412 4/
March 5	82 1/	July 3	380 4/
April 2	47 2/ (600) 3/	July 16	267 4/
April 12	59 2/	July 30	269 4/
April 18	109 2/	August 20	99 4/
April 26	69 2/	September 27	51 4/ (325) 3/
May 8	188 2/	October 15	0 4/ (9) 3/
May 22	261 2/	December 13	0 4/ (5) 3/

1/ Entire epidemic area

2/ Zone I and II

3/ Estimated spots for entire epidemic area

4/ Zone IA and II (Zone I divided into 2 parts)

The 1961 report contained a tabulation of total number of infested spots detected by aerial flights and the size of the epidemic for each year of the project. This information is presented below with the addition of figures for 1962. It is generally agreed that hurricane Carla of September 1961 and the large number of uncontrolled spots on January 1, 1962 was largely responsible for the tremendous increase in acreage involved.

Year	Total Spots Detected on Flights	Estimated Acreage Involved
1957	Unknown	200
1958	106	60,000
1959	108	200,000
1960	436	200,000
1961	943	600,000
1962	2200	4,500,000

CONTROL

Several changes occurred in the Southern pine beetle control program this year. While problems such as delay of control due to excessive rainfall and inaccessibility to infestations decreased compared to past years, the epidemic increased in size 7.5 times over 1961, with a record number of infestations and owners which further complicated efforts to bring this pest under control. Control efforts on the Angelina, Davey Crockett and Sam Houston National Forests were handled by USFS personnel. Although there was close coordination between the Project Coordinator and USFS on detection and control efforts, figures shown in this report do not include information on National Forests.

Due to the rapid spread of the insect the "zone plan" was put into effect to concentrate control efforts in strategic areas. Spread has been primarily northwesterly in direction since the beginning of the epidemic. Zones I and II encompass the north and west periphery of the area, and were activated simultaneously with a two-fold objective: either accomplish control by a "pinching off" process, or contain the epidemic within its present boundaries until natural factors reduce the population to an acceptable level.

Rigid inspection of control operations were made by the Texas Forest Service. Each landowner was advised of the results of the inspection and where improvement could be made.

Weather did not seriously hamper control operations during the year. As mentioned already, the priority zones favored control operations in that they were located at a higher elevation than the flatwoods area and possess a better internal and horizontal drainage system. August was a dry month with 18 successive days of temperature 100 degrees plus F. over most of the area. This event is believed to have caused poor brood survival in infested trees. Although no evaluation was made, considerable mortality of broods beneath the bark of infested trees following the period was observed by entomologists and others. Mites, nematodes and other parasites on the beetles were responsible for part of this mortality.

Tabulation of Uncontrolled Spots
On Specific Dates

Date	Zone	No. Spots Uncontrolled
February 22	All	500
April 4	I & II	600
June 1	All except I & II	1500
July 6	IA and II	1068

In March 1962 it was learned that there was no longer a provision of the law to permit control operations on lands of recalcitrant owners. The Texas Forest Service loaned spray cans, and gave BHC to small landowners in an effort to encourage control operations. Three control crews were later organized, one each in Zones I and II, and one crew to control an infestation on the Kirby State Forest.

The recommended spray mixture was changed from 1 gallon BHC concentrate in 40 gallon diesel oil, to 2 gallons BHC concentrate in 50 gallons diesel oil. An extensive educational program was initiated using radio, television, and newspapers.

A narrated film of the 1962 epidemic was prepared for use on TV and elsewhere in showing the public the destructive potential of the insect.

In November, evaluation studies were begun to observe the insect during the winter months. Aerial surveys to determine population trends complemented by observations from research studies will be used to forecast springtime conditions next year.

Project Personnel

The number of persons employed in detection, control and salvage operations increased considerably in 1961. Listed below are the estimated number of persons employed in the various categories of work.

1. Aerial detection	26
2. Supervision and clerical	8
3. Ground checking	75
4. Control	252
5. Salvage operations	110
Total	471

Incomplete reports were received of seven persons who reported ill effects from the use of BHC. Poisoning varied from minor skin irritation to the need for hospitalization.

Volume of Timber Killed

In 1962 the volume of timber killed by the Southern pine beetle was more than double the amount killed in all previous years of the current epidemic combined.

The tabulation on the next page is compiled from landowner reports and Texas Forest Service records to show the volume of timber killed each year since 1958.

Timber Killed (Volume)

	1958	1959	1960	1961	1962	Total
Sawlogs (M Bd. Ft.)	500	2,500	8,000	17,887	93,043	121,430
Pulpwood (Cords)	--	2,500	8,000	24,000	111,110	145,610

An estimated 45 percent of the attacked trees of sawtimber and pulpwood size was salvaged during 1962. Since 1958, the timber on an estimated total of 44,460 acres has been killed by Southern pine beetles in East Texas. Some extensive areas have had a change of type from pine-hardwood to hardwood.

SUMMARY

The size of the epidemic, expressed in number of new infestations, total area covered and volume of timber killed has increased each succeeding year since 1958. The largest control force of any year of the epidemic was employed this year, but was unable to keep pace with the explosive beetle population. The 1962 epidemic was the worst of the century, perhaps ever. It killed more trees, covered more area and cost more to control than any other known epidemic.

Zones I, IA and II, the northern and western part of the area, received priority in control operations during the spring and summer peak of insect activity due to the rapid increase in the epidemic size and problems involved in keeping the control program activated through complete landowner cooperation. In late summer, a sharp decline occurred in the Southern pine beetle population and control operations were revised in an attempt to control all known active infestations. The five small infestations that remained at the end of the year were reserved for research study areas.

An evaluation of winter Southern pine beetle developments was initiated in November 1962 to obtain information on the status of the epidemic prior to next spring. During the remainder of 1962, broods appeared healthy in infested trees located in the research study areas. Lightning struck trees containing active broods were observed scattered over most of the epidemic area.

Landowners were reminded to remain alert for signs of damage by Southern pine beetles. If brood trees are found, they should be controlled immediately. Although the Southern pine beetle population declined sharply, it is too soon to positively predict the end of the epidemic. Landowners were requested to recheck infestations that were most recently active. If brood trees were found, they are to be cut and sprayed.

DLW/DY/et
March 9, 1963
Attachments

LITERATURE CITED

Green, A. E.,	1959	Observations During the 1958 Epidemic of Southern Pine Beetle. Unpublished report, Texas Forest Service, District #4, Woodville
Green, A. E.	1961	Observations During the 1959 and 1960 Epidemic of the Southern Pine Beetle. Unpublished report, Texas Forest Service, District #4, Woodville
Williamson, Leroy	1962	Observations on the 1961 Southern Pine Beetle Epidemic. Unpublished report, Texas Forest Service, District #4, Woodville

APPENDIX

Statement of Landowner Expenditures for the period January 1, 1962 through December 31, 1962

Area of Infestation, 1962

Control Zone Map

Detection and Control Reporting Form

Recommended Control Procedure (Revised 6-26-62)

Notice of Infestation (6-27-62)

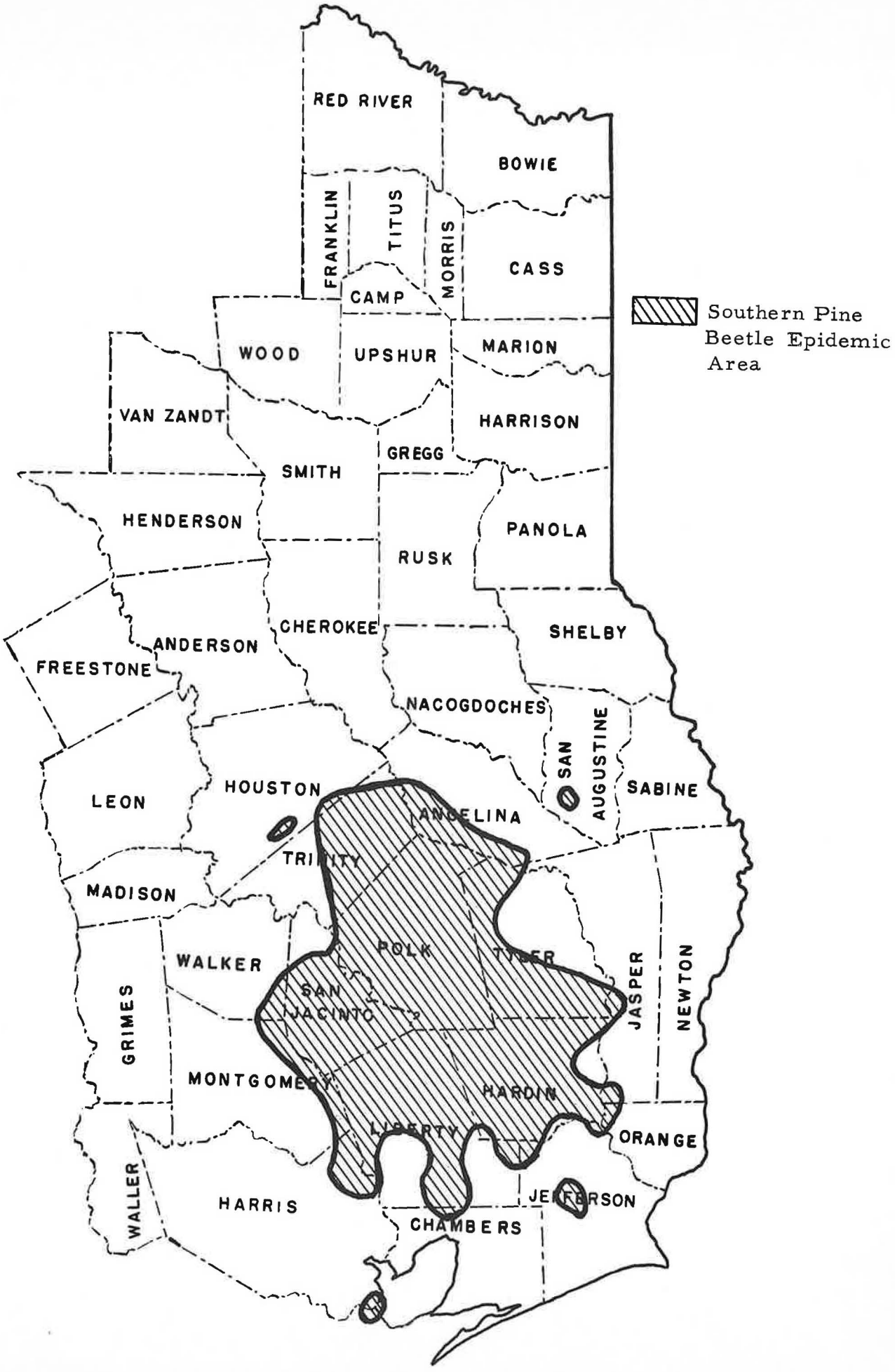
Control Plan effective September 1, 1962

STATEMENT OF EXPENDITURES
Southern Pine Beetle Project
For Period January 1, 1962 - December 31, 1962

Angelina County Lumber Company	$ 3,142.95
W. T. Carter and Brother	55,636.85
Champion Papers Inc.	38,815.08
Cowser and McCombs	65.00
Wirt Davis Estate	22,937.66
Grogan Land Company	9,814.76
J. B. Hooks Estate	260.00
Thomas S. Hooks	130.00
International Paper Company	37,375.95
Keith Company	25,573.65
Kirby Lumber Corporation	148,730.43
Marbann Corporation	8,268.26
T. J. Moss Tie Company	4,482.84
Ogletree Lumber Company	6,239.82
Racki Lumber Company	14,046.04
Terry Investment Company	336.54
Gordon Reily	1,631.65
Southern Pine Lumber Company	5,437.05
Alabama-Coushatta Indian Tribe	1,092.82
Baldwin and Baldwin	759.41
Watt Barclay Estate	174.00
M. L. Barneycastle	102.00
Johnie Berry Estate	70.00
Foster Lumber Company	1,688.32
Rice University	944.00
J. E. Wheat	195.00
W. A. Holder	104.50
League-Davis Properties	7,236.20
G. E. Schultz	79.73
Audrey Moody Ley	195.00
Pope, Pope and Willoughby	125.00
Estate of B. E. Quinn, Sr.	715.00
Southwestern Settlement & Development Co.	35,508.81
Southland Paper Mills	33,822.74
L. L. Williams	4,068.87
Texas Forest Service	21,614.79
Total	$ 491,420.72

DLW/DY/et
March 9, 1963

Southern Pine Beetle Epidemic Area - 1962



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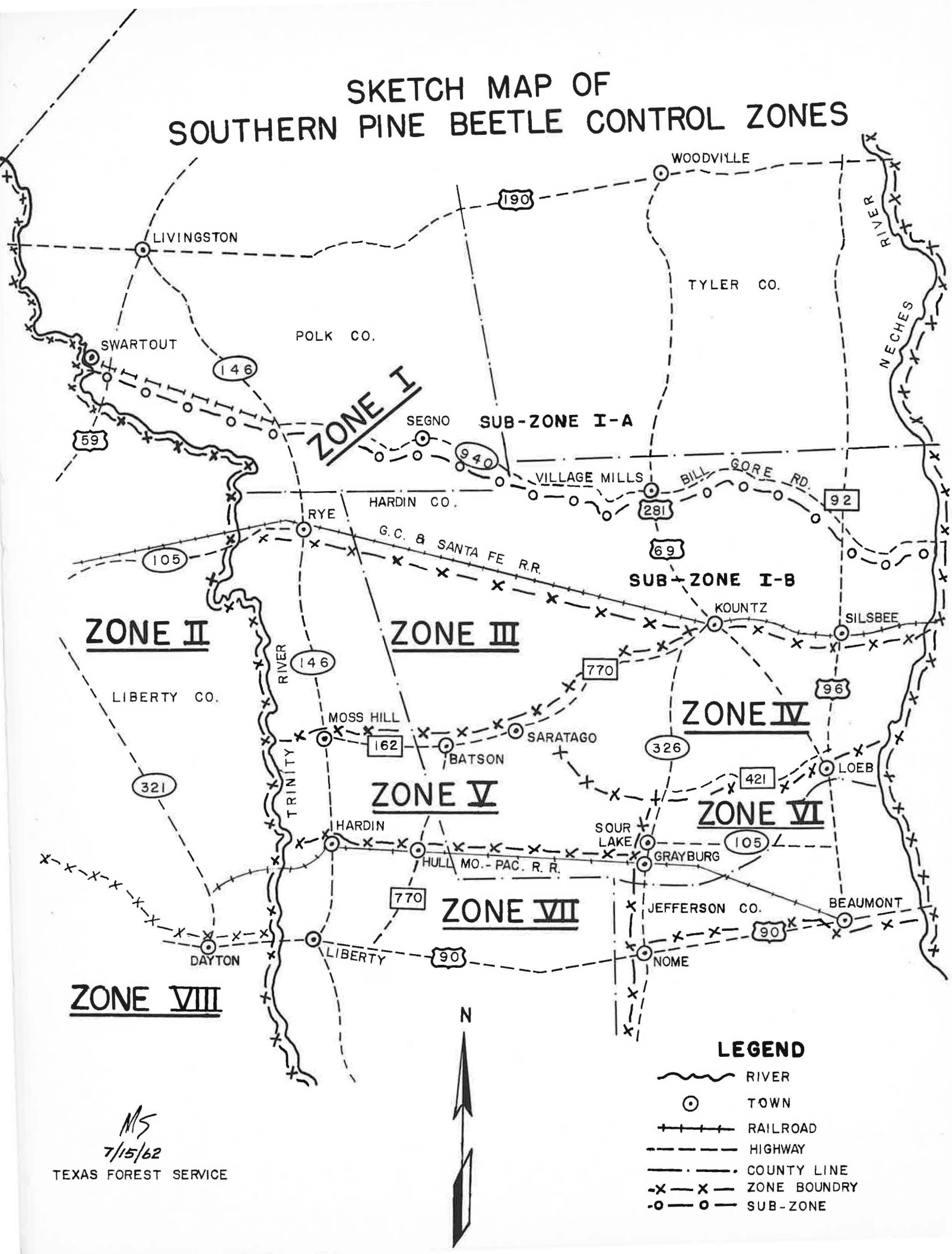
SKETCH MAP OF SOUTHERN PINE BEETLE CONTROL ZONES



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7/15/62
TEXAS FOREST SERVICE

6.3562

TEXAS FOREST SERVICE
Southern Pine Beetle Detection and Control Report

OWNER_____ ADDRESS_____ FLIGHT DATE_____ ZONE_____

GRID	COUNTY	EST. NO. TREES	REMARKS	CONTROL DATE	ACTUAL NO. TREES

3.362

TEXAS FOREST SERVICE

Recommendations for Cutting and Spraying of Trees
Infested by Southern Pine Beetles

1. Suggested Crew Organization:

A three-man crew is best with one man operating the power saw, one spraying and the third turning logs to be sprayed. One man should be in charge and mark infested trees.

2. Recommended Chemical Treatment:

The best chemical is a mixture of No. 2 fuel oil and 11% Benzene Hexachloride (BHC). The correct mixture is two (2) gallons of BHC to fifty (50 gallons of oil. (It takes approximately 1½ gallons of mixed solution to spray average size tree).

3. Equipment needed:

1 - Power saw or other type of felling saw

1 - Axe

1 - Cant hook

1 - Sprayer, garden type pressure, preferable stainless steel or brass with neoprene hose, brass wand and nozzle. The chemical will soon eat out othe types of containers and hoses. Spare parts for sprayer are essential.

4. Steps to be followed in treating the infested trees:

a. Fell trees and cut into lengths that can be easily treated.

b. Spray all infested portions of the tree including the stump. The BH solution should be applied until the bark is soaked and there is some run-off. After the top surface of the trunk is sprayed, the log should be turned and th other areas sprayed. It is especially important that all surfaces be sprayed.

c. Each tree should be treated before felling another tree across it.

d. Keep spray nozzle about one foot from the bark surface.

e. All trees cut should be sprayed before leaving the job for the day. Unsprayed trees might be forgotten and allow beetles to escape and attack othe trees.

f. If the infested logs are to be salvaged and utilized immediately, no spraying is necessary. All remaining infested material should be sprayed.

g. If the material is to be salvaged but not utilized immediately this and other infested material should be sprayed.

h. After control has been completed, a strip about 100 yards wide should be scouted for additional infested trees.

i. CAUTION - BHC IS POISONOUS TO HUMANS. Keep it off your skin and away from your eyes and nose. Wash carefully with soap and warm water after mixing or applying spray.

5. The following is available from the Texas Forest Service at Woodville:

a. On-the-ground training of crews in insect identification and control techniques.

b. Information on sources of supplies and materials.

DLW/et
6-26-62

6.3562

Texas Forest Service
Southern Pine Beetle Damage In This Area

To whom it may concern:

The Southern pine beetle is currently killing pine timber throughout Southeast Texas. The effect of the insect has been observed in this area. The beetle kills only pine; hardwoods are not affected.

Your cooperation is urgently needed in locating and destroying this pest.

There is a possibility that such an infestation exists on your land at this time. The insect is capable of killing many large pine trees in a short period of time. Symptoms of attack by this insect are characterized by (1) dying or dead needles throughout the crown of the tree evidenced by light green or brown needle color; (2) presence of small pitch tubes on trunk; and (3) red boring dust in bark crevasses. A copy of our Circular 43 is attached for further information.

Please check your timber to determine if such an infestation exists on your land.

If you find evidence of damage by this insect and need help on procedures for control, you should contact:

DY/bh
6/27/62

5.4121

Texas Forest Service

CONTROL PLAN
for
SOUTHERN PINE BEETLE INFESTATIONS
EFFECTIVE SEPTEMBER 1, 1962

At a meeting of the Executive Committee of the Forest Pest Committee on September 6 there was agreement to support a revised control plan presented by the Texas Forest Service. The U. S. Forest Service approved the plan on September 13. The Texas Forest Service will continue as coordinator.

For landowners with spots that have brood trees in several of the zones shown on the attached map, priority will be given to control in the northern and western portions of the epidemic area, then proceed to areas to the south and east. The Texas Forest Service crews will also operate in a similar manner. The sequence of control work will start in Zone IA and II and proceed in numerical order to the other zones.

Each spot controlled will require examination for re-infestations and immediate control if found.

The primary emphasis is on control, not utilization or salvage. Unless each owner recognizes this principle and applies it, the control efforts of other landowners will be futile.

All trees infested with the Southern pine beetle, including single-tree infestation, will be felled. Immediate brood tree utilization is regarded as a form of control, but the parts of the tree not utilized, e.g., tops and stumps, must be sprayed with BHC if infested and all other infested trees in a "spot" of infestation must be felled and sprayed. Infestation is to be determined by supervisory personnel trained in this technique. "Immediate" brood tree utilization is defined as getting the logs to the mill within 48 hours after the infested tree has been felled. Unless the infested logs intended for utilization are removed from the site, they must be sprayed within 48 hours after having been felled.

Salvage of dead timber is encouraged by the Texas Forest Service, but it is not a form of control. Utilization of brood trees at all times throughout the entire epidemic is urged.

Aerial detection flights will be made by the Texas Forest Service starting in the week of September 17 to determine the apparent active spots. Those spots presumed active will be ground checked, using the same procedure and personnel as in the immediate past.

The objective of the control plan is to have all known active brood trees controlled by December 15. The procedure will be as follows:

a. Large landowners will control infestations on their own lands.

b. Small landowners will be urged to do the control work on their lands. When a small landowner is unwilling or unable to conduct control operations, then a Texas Forest Service crew will endeavor to get that landowner's permission to conduct the control work. If granted, a Texas Forest Service crew will do the control work gratis on forest ownerships of spots on less than 400 acres. If funds are available, control will be done on other small landowners' holdings with less than 2500 acres in the whole epidemic area. Active spots for which the owner will not give permission to control will remain untreated.

The Texas Forest Service will continue work on small ownerships until funds allocated for this purpose have been exhausted.

No work will be done within corporate limits, but effort will be made to persuade municipalities to do the control work. When all efforts to accomplish control work within corporate limits of a municipality have failed to accomplish the desired results, an appeal may be made to the Director, Texas Forest Service for authorization for Texas Forest Service crews to do the work.

Employees of the Texas Forest Service are available to train control crews, to train in identification of the beetle and to train in mop-up maintenance operations.

Inspections of control work to determine its effectiveness will be done by foresters in the employ of the Texas Forest Service.

A copy of the organization chart for the project is attached.

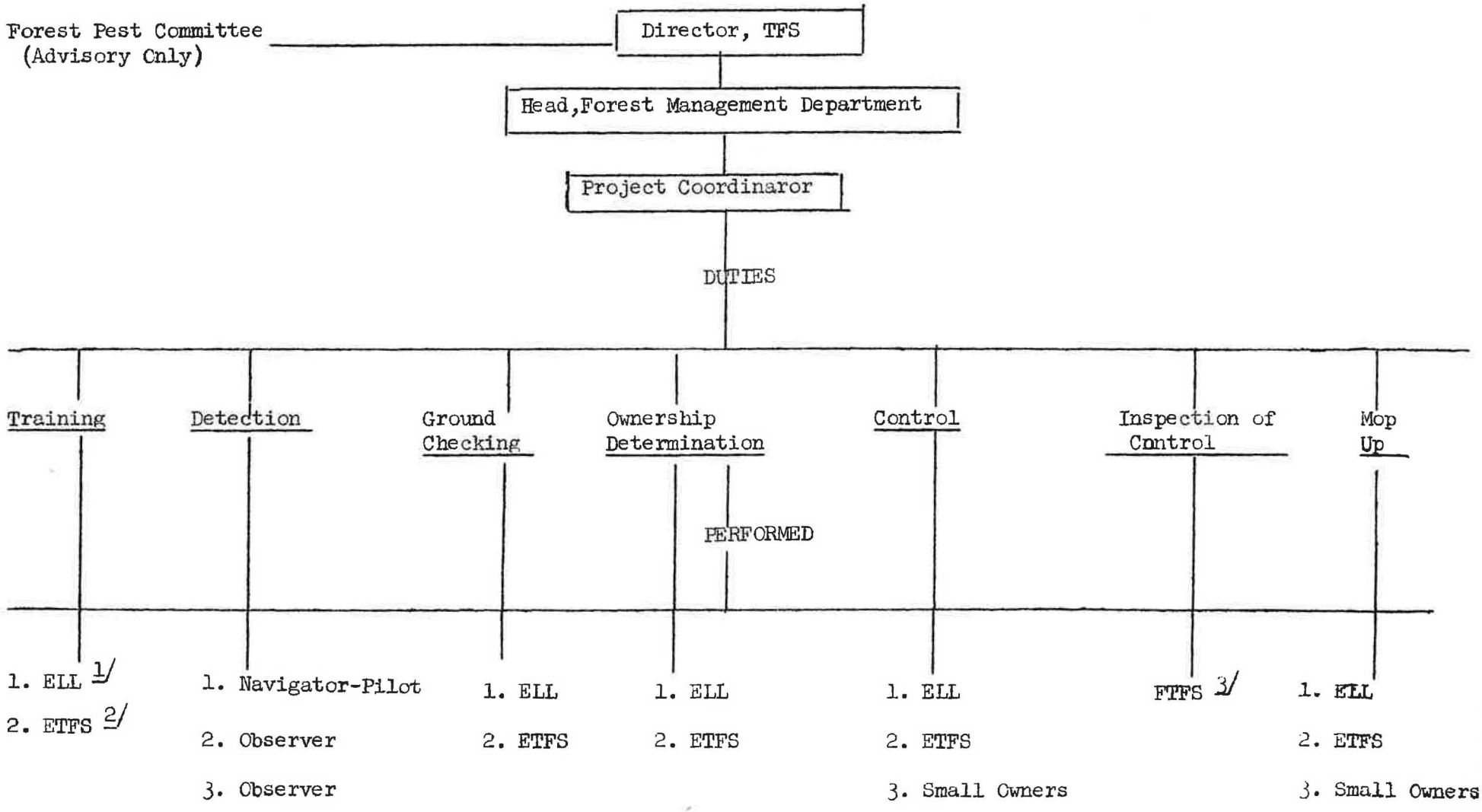
Effective September 1, all owners will be reimbursed, as modified in a preceding paragraph, for expenditures for control work in all zones until January 1. At that time, this policy will be reviewed and either continued or revised.

Only expenditures directly related to felling and spraying should be reported on the monthly "Report of Southern Pine Beetle Control Expenditures" Form FM-17 available from the Texas Forest Service. Expenditures for the removal of brood trees for utilization should be excluded in reports submitted to the Texas Forest Service for reimbursement.

DY/et
Attachments

College Station, Texas
September 18, 1962

ORGANIZATION CHART
SOUTHERN PINE BEETLE CONTROL PROJECT



1/ ELL - Employee of large landowner
2/ ETFS - Employee of TFS
3/ FTFS - Forester employed by TFS